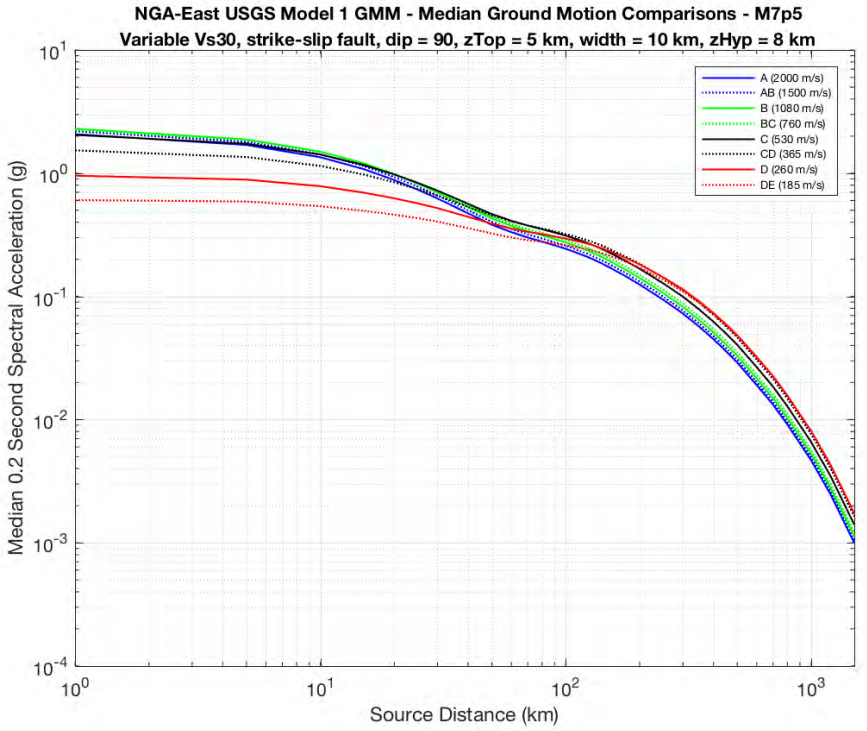
Implementation of the NGA-East Site Amplification Model: Results and Discussion

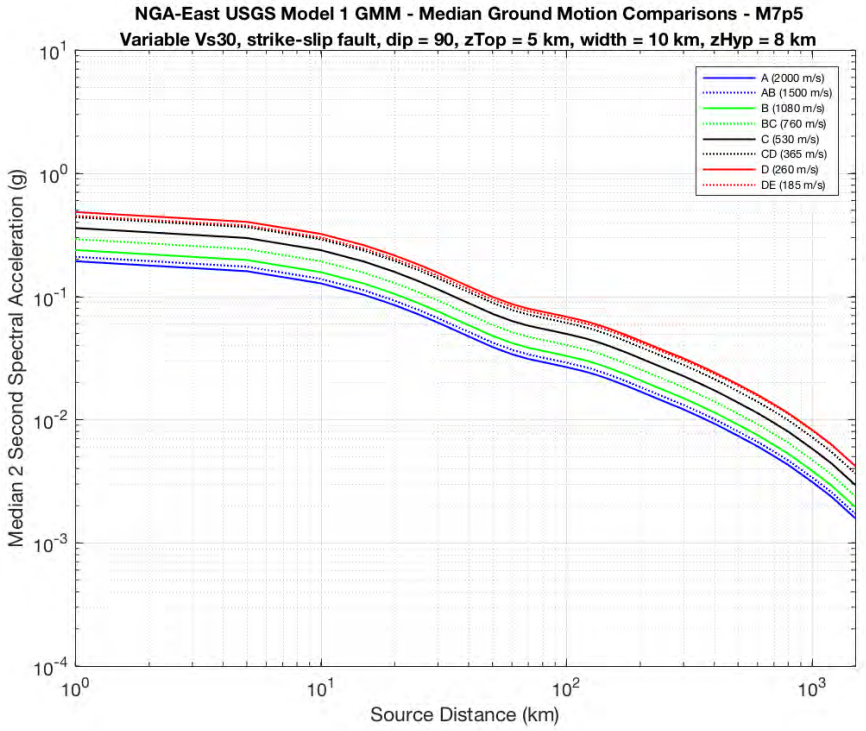
Presented by Eric Thompson
USGS, Golden, CO
USGS 2018 NSHM Update Workshop
Wednesday, March 7th, 2018
RMS Headquarters, Newark, CA

U.S. Department of the Interior
U.S. Geological Survey

NGA-East Linear and Non-linear Site Amplification Model



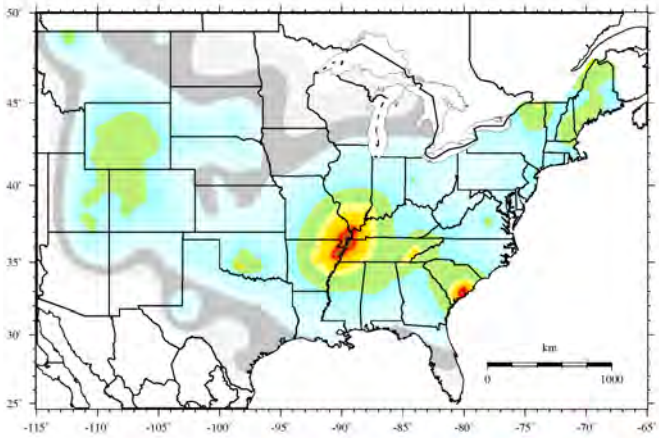
Note: The cross-over around 100 km is due to the nonlinear part of the model (shows up in site response at short periods and short distance). Model is valid down to 200 m/s, therefore, Site Class Boundary D/E is using 200 m/s.



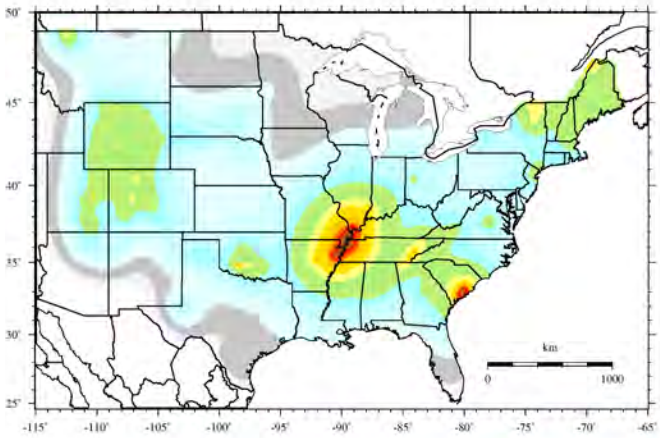
Note: At long periods and all distances, the linear part of the model takes over. Model is valid down to 200 m/s, therefore, Site Class Boundary D/E is using 200 m/s.

Comparison of 0.2 Second Total Mean Hazard

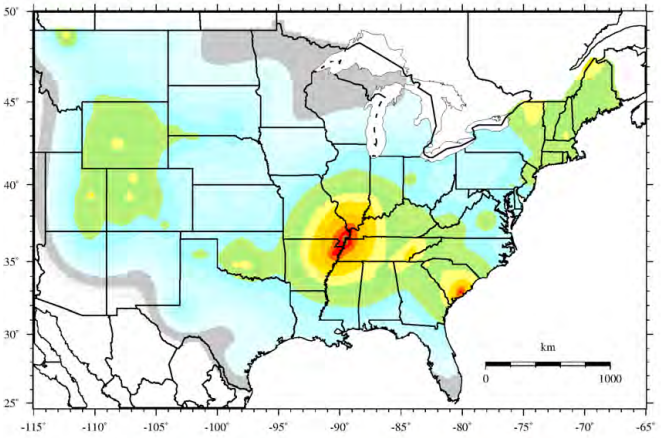
V_{s30} = 2000 m/s

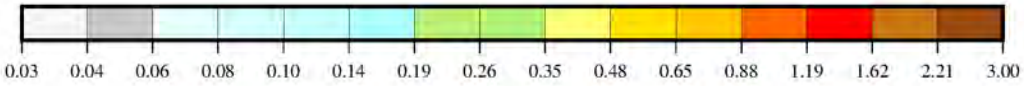


V_{s30} = 760 m/s



V_{s30} = 260 m/s

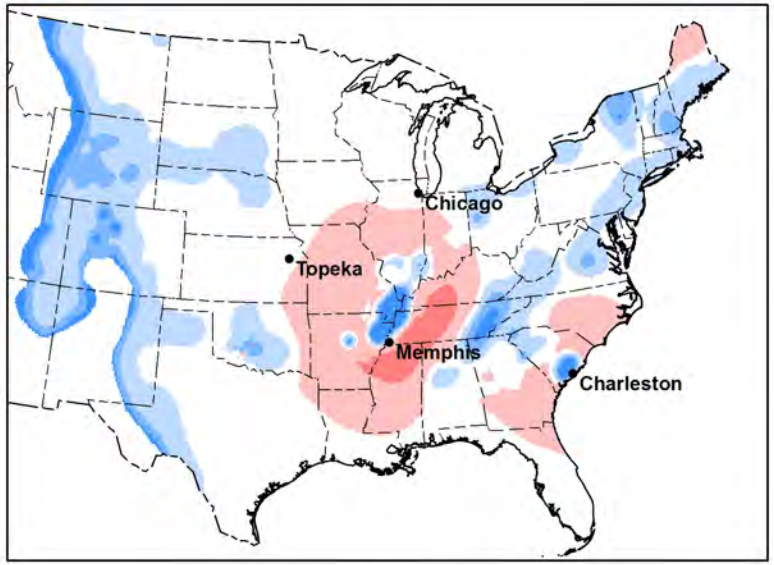




0.2 Second Spectral Acceleration (g)

Comparison of 0.2 Second Total Mean Hazard

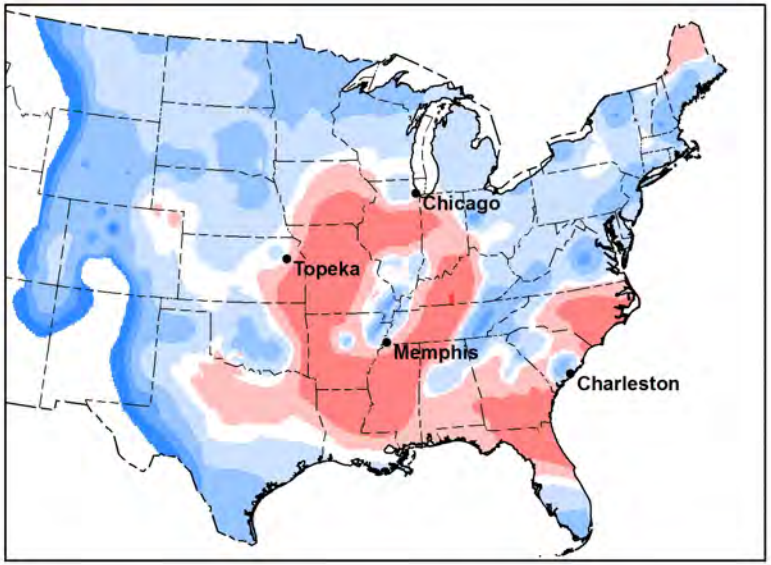
0.2-second spectral acceleration, 2% probability of exceedance in 50 years, NEHRP site class B/C



(2018 proposed) - (2014 NSHM)

Difference

-0.6 -0.1 -0.05 -0.01 0.01 0.05 0.1 0.5

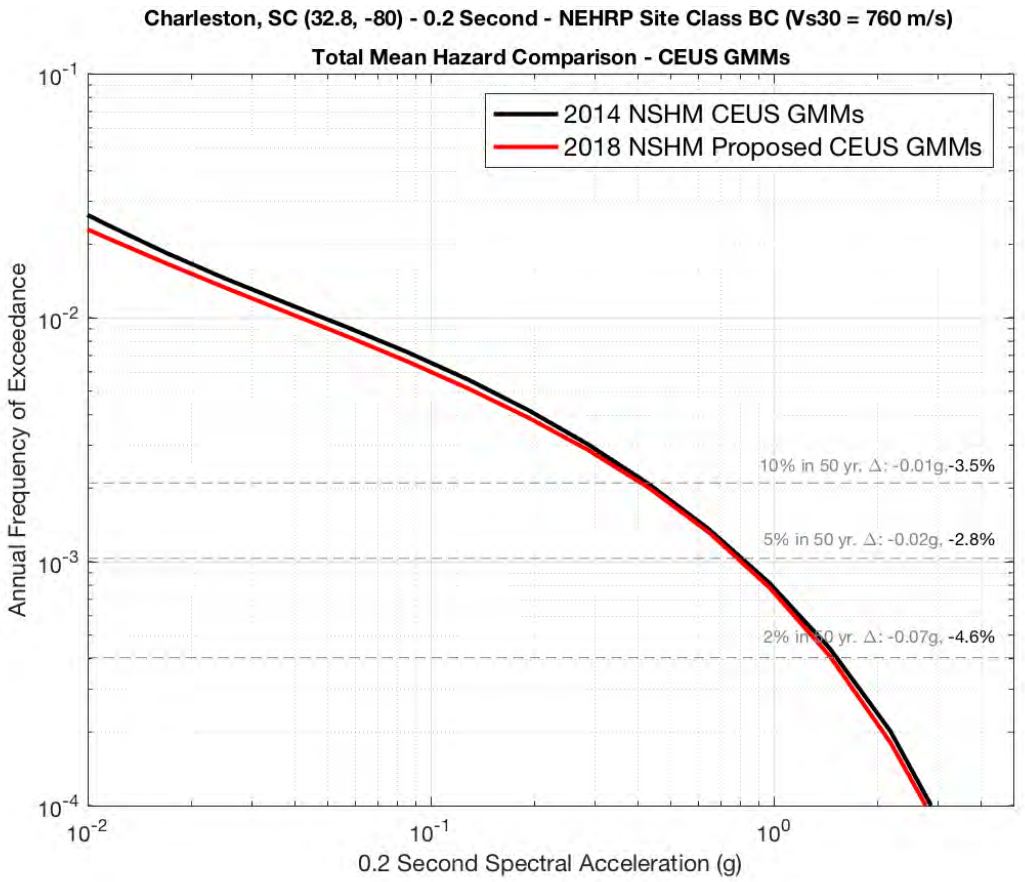


(2018 proposed) / (2014 NSHM)

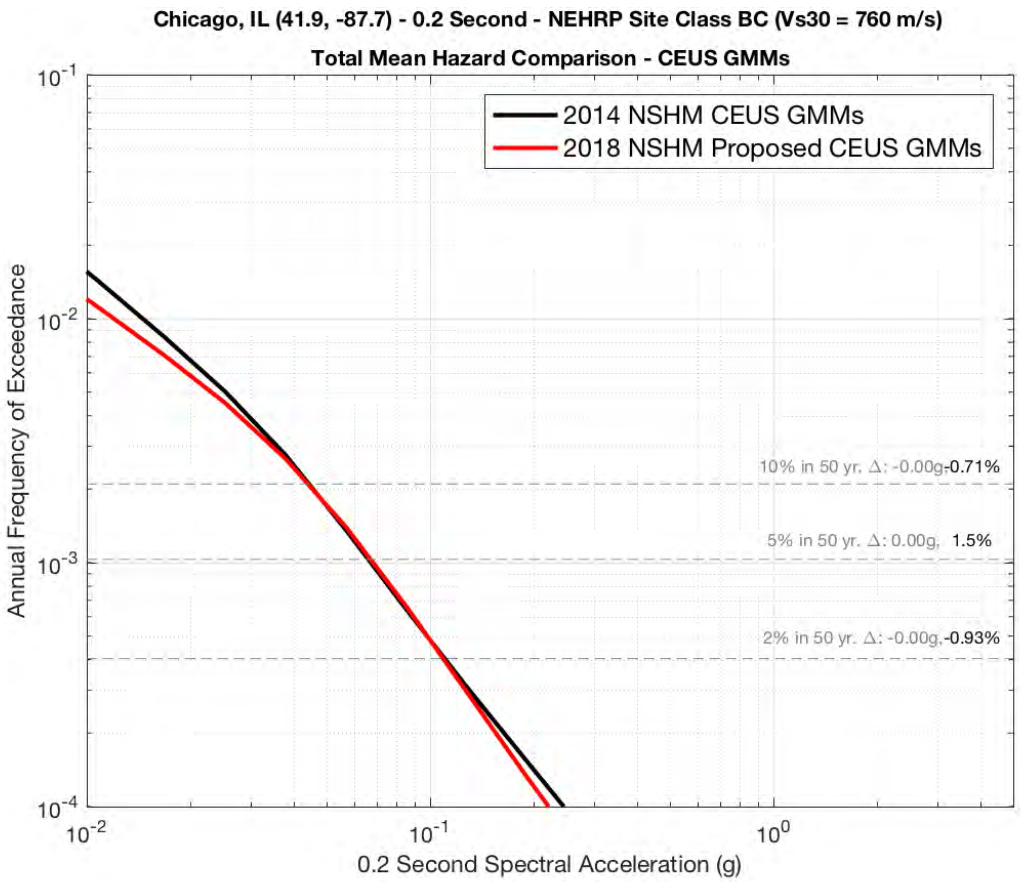
Ratio

0.15 0.67 0.8 0.9 0.98 1.02 1.1 1.25 1.5

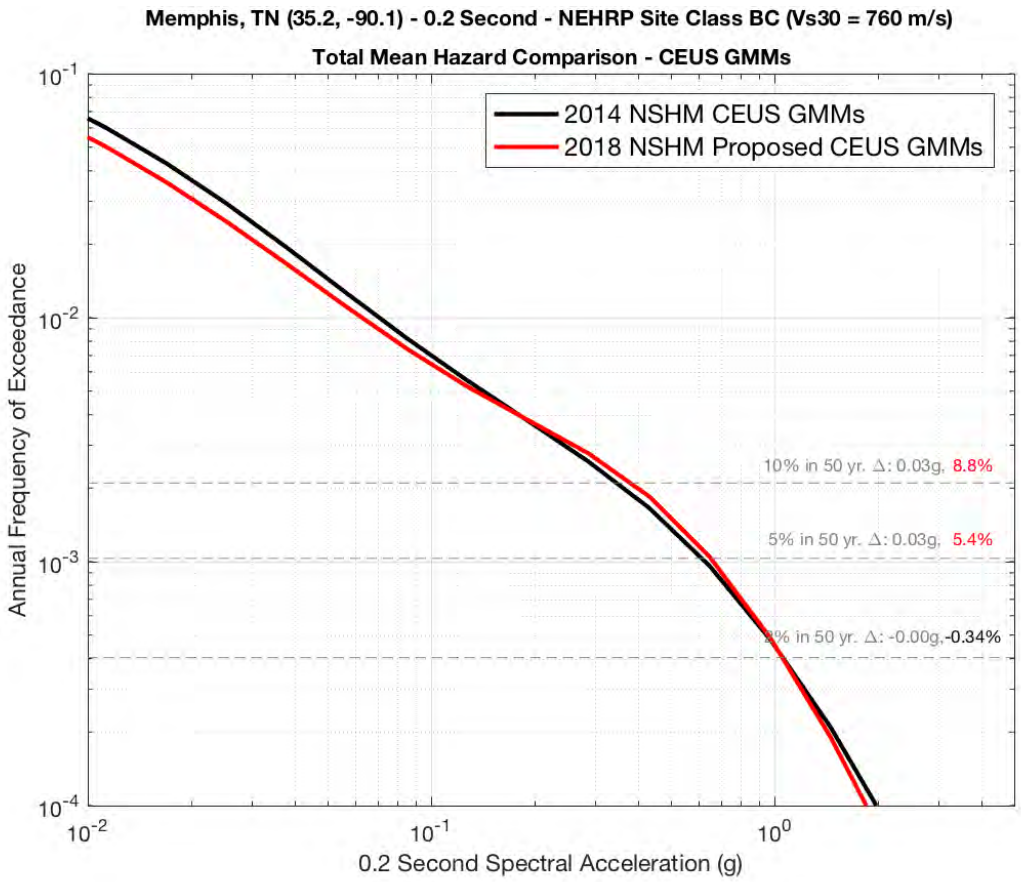
Hazard Curves: Charleston, SC



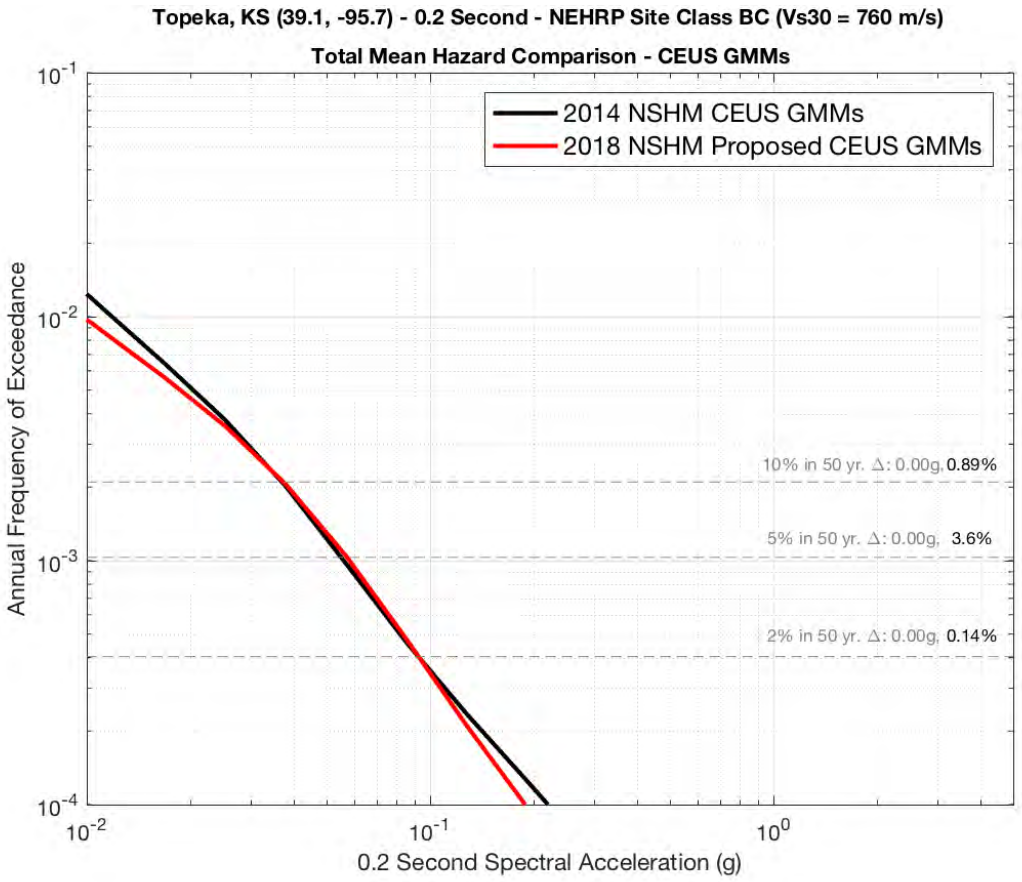
Hazard Curves: Chicago, IL



Hazard Curves: Memphis, TN



Hazard Curves: Topeka, KS



Comparison of 2 Second Total Mean Hazard

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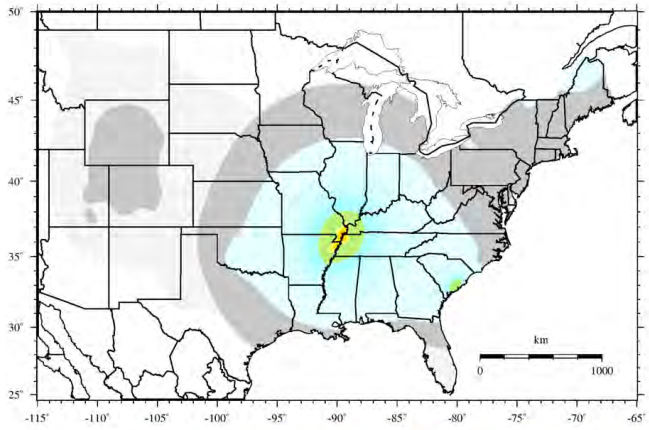

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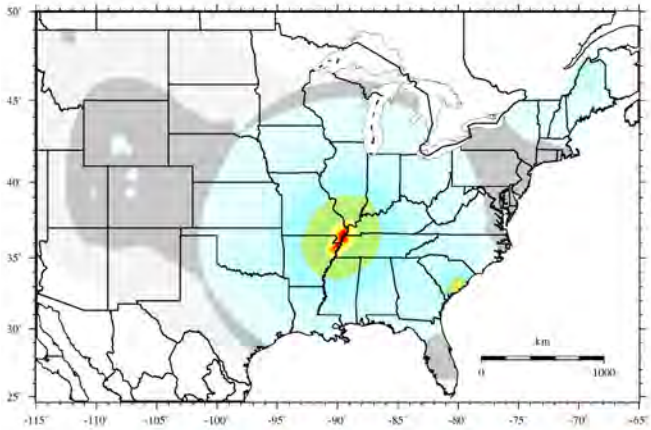

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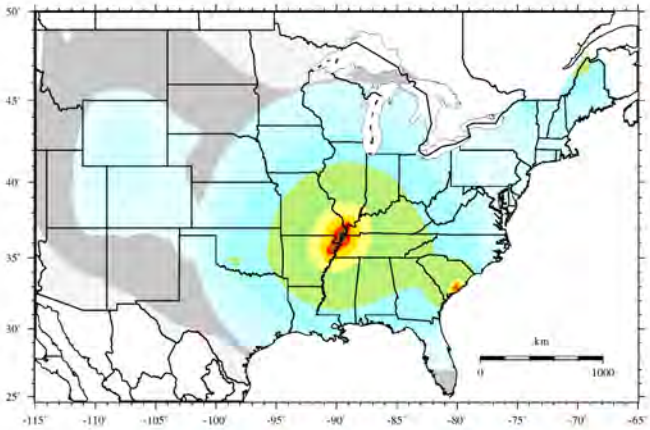

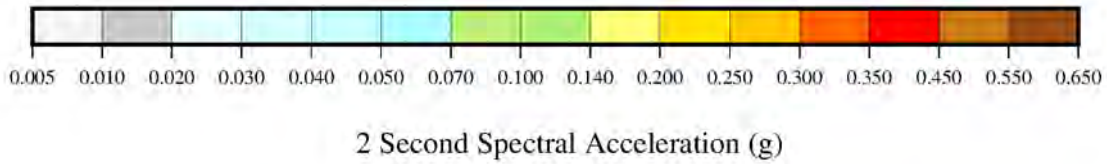

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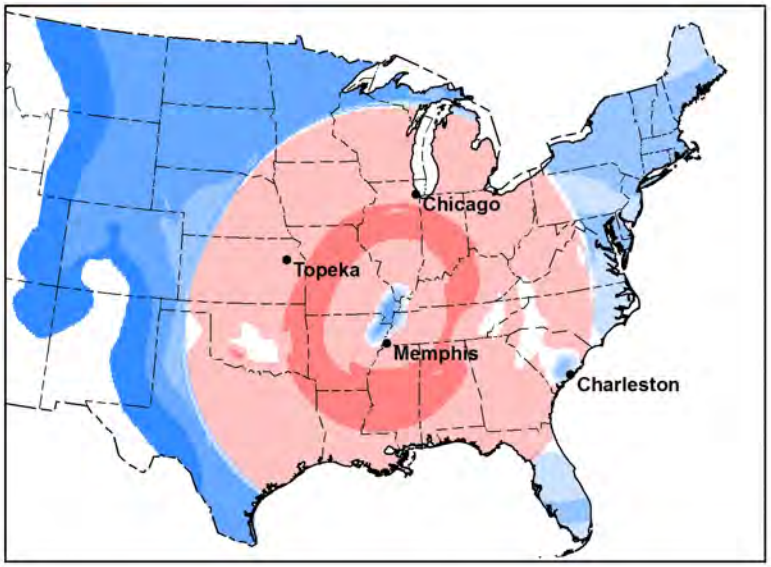

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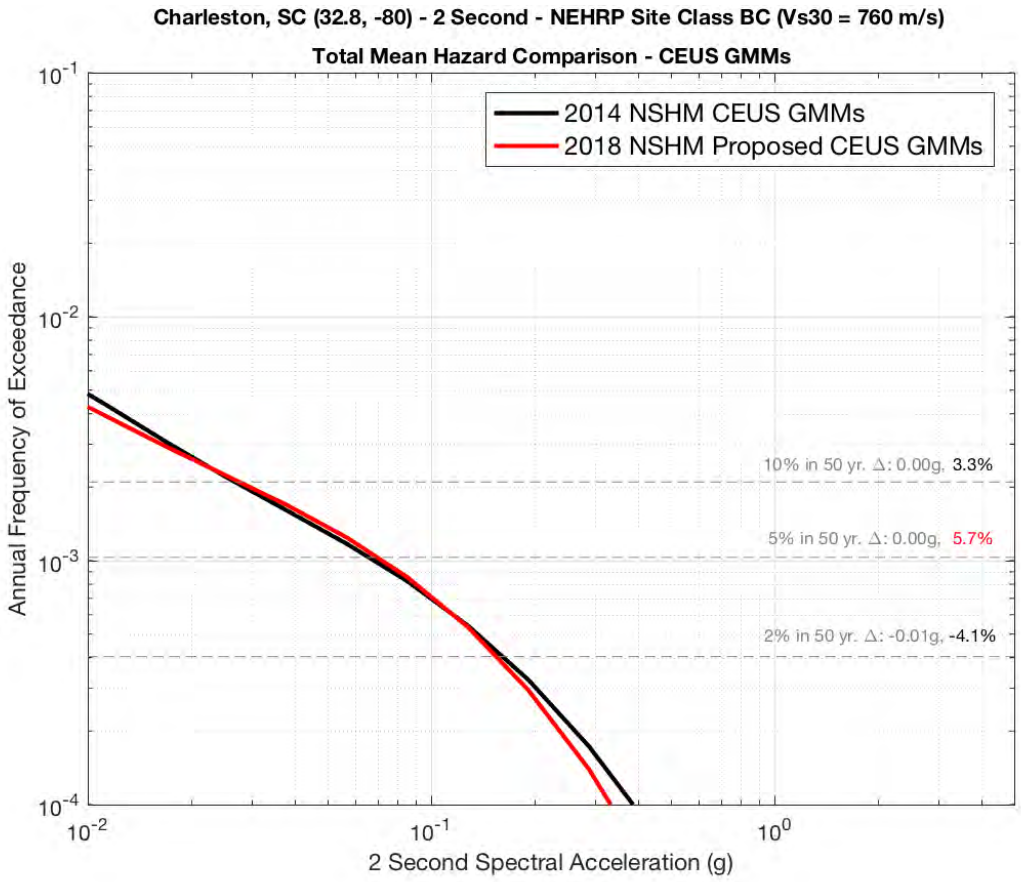

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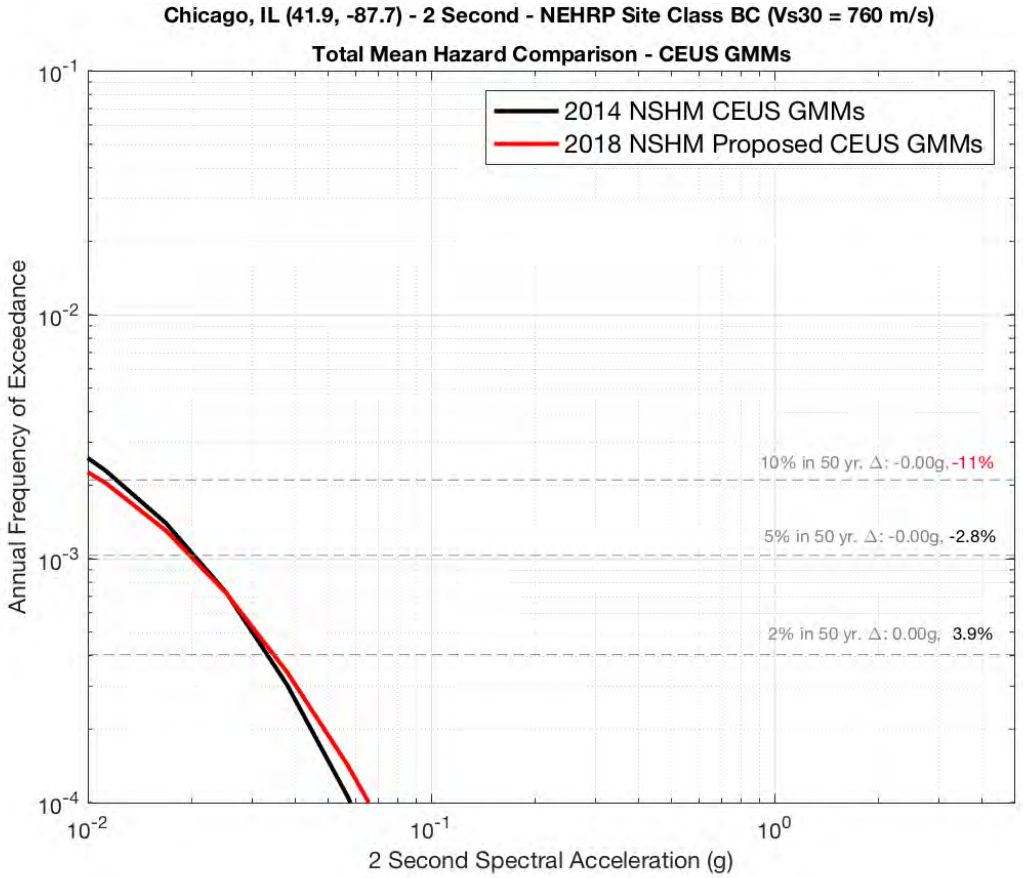

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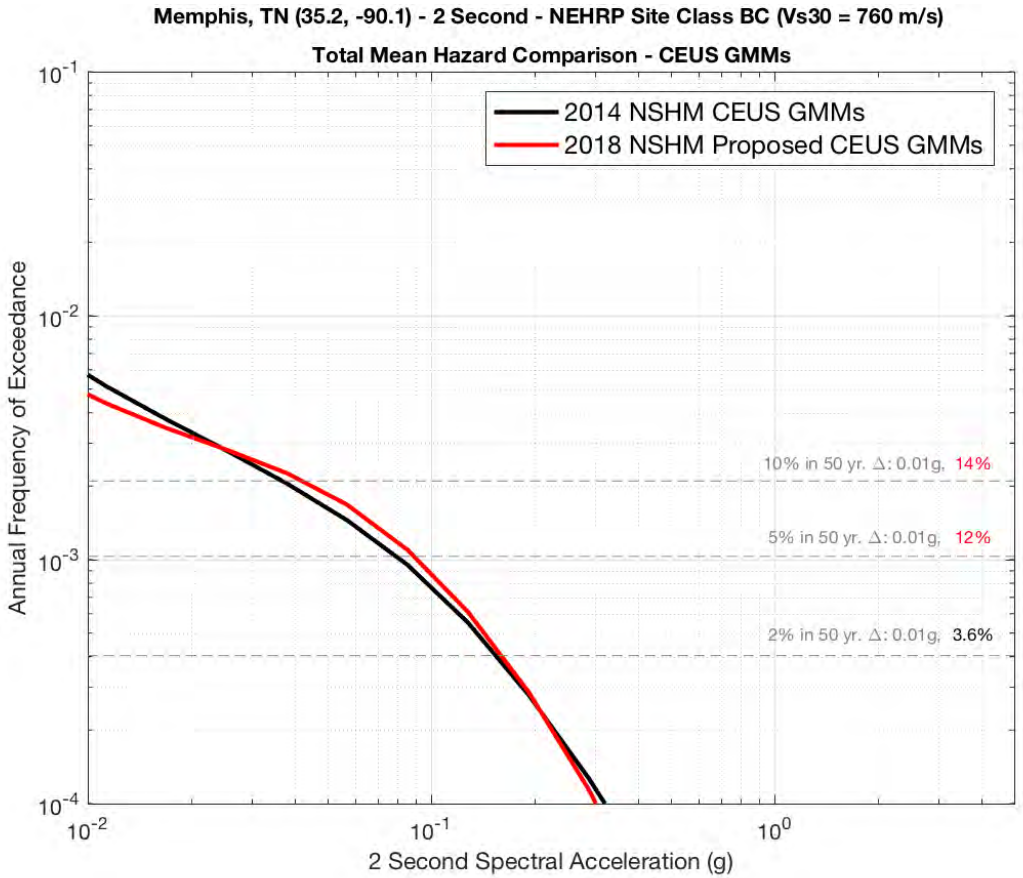
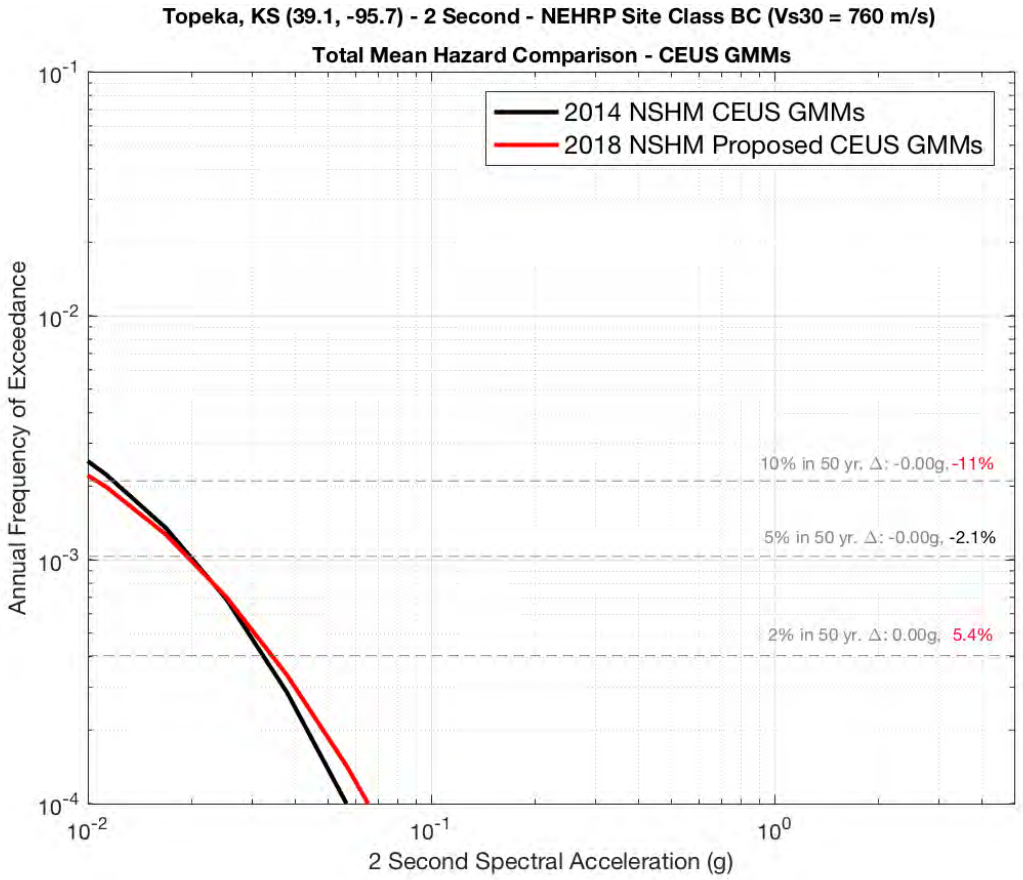
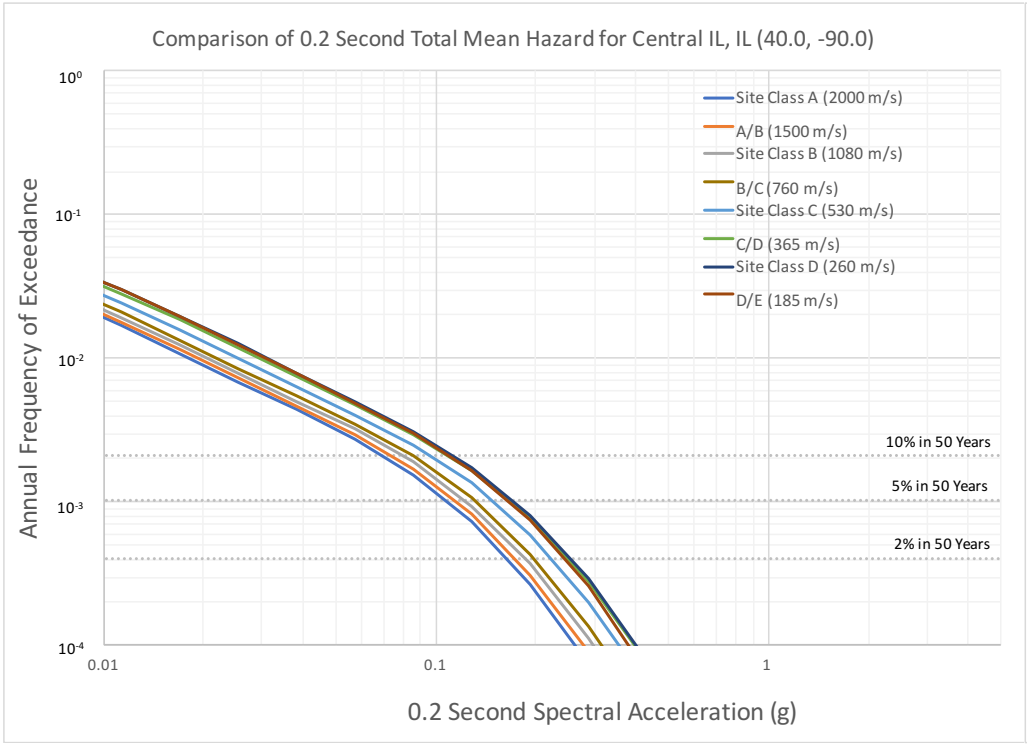
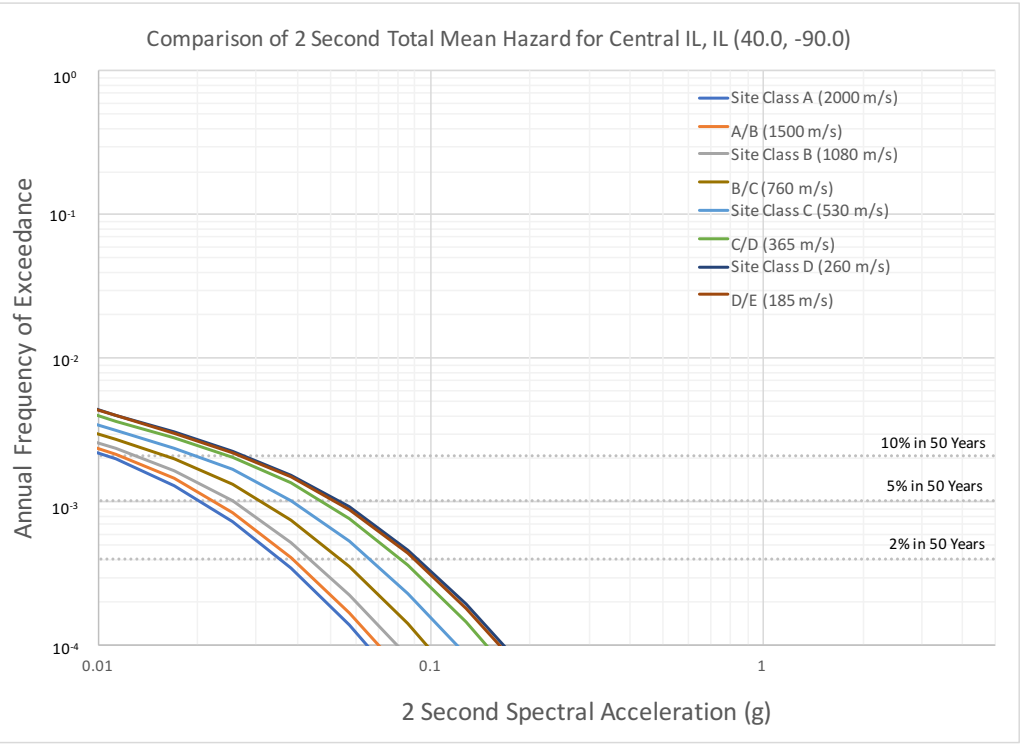


Hazard Curves: Topeka, KS



Hazard Curves: Central Illinois, IL





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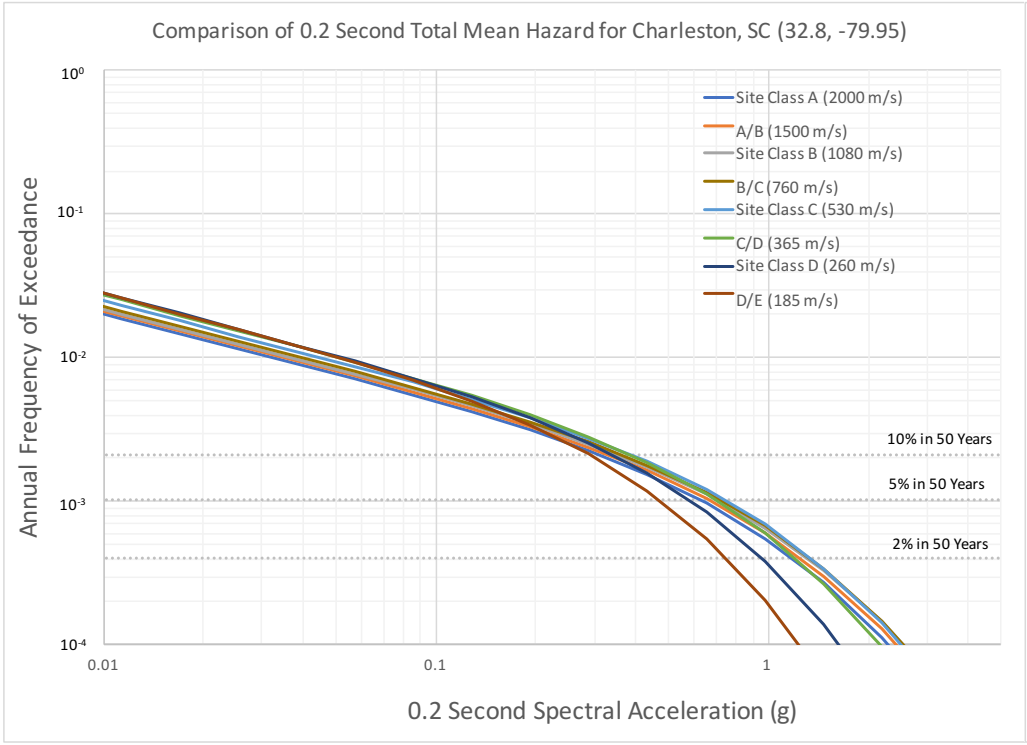

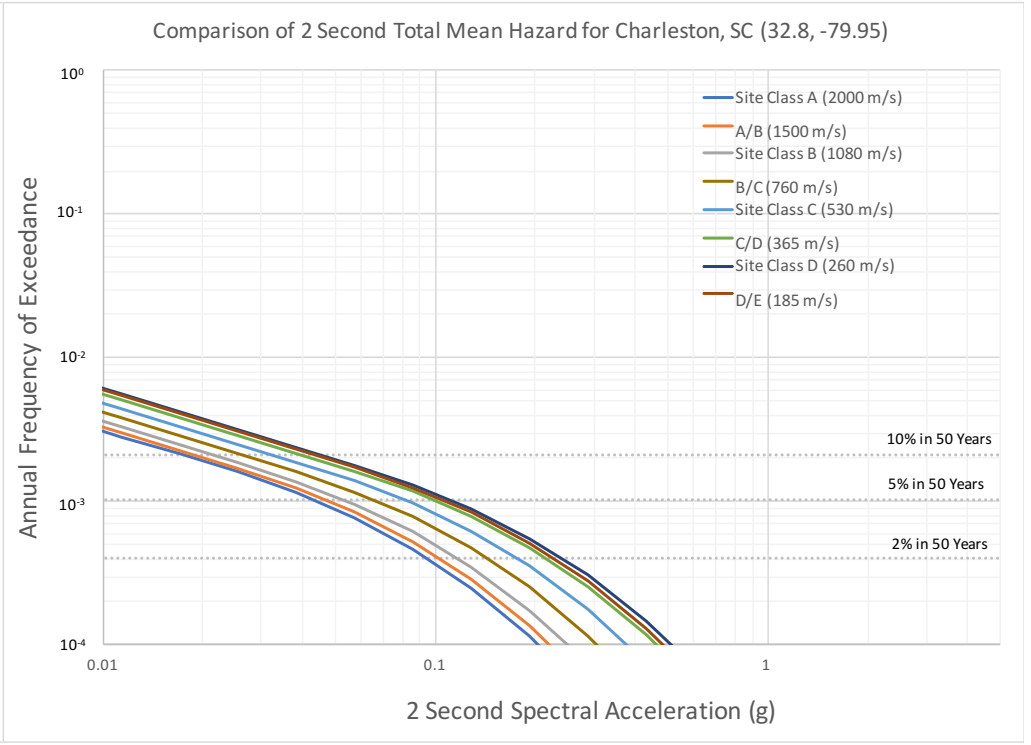

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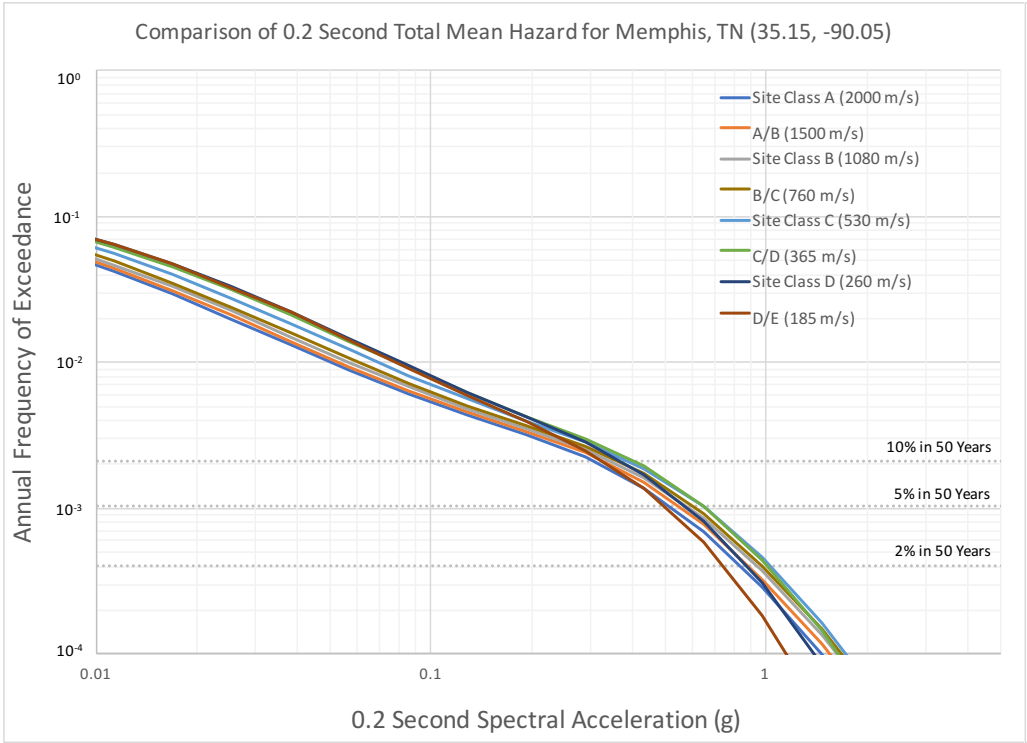

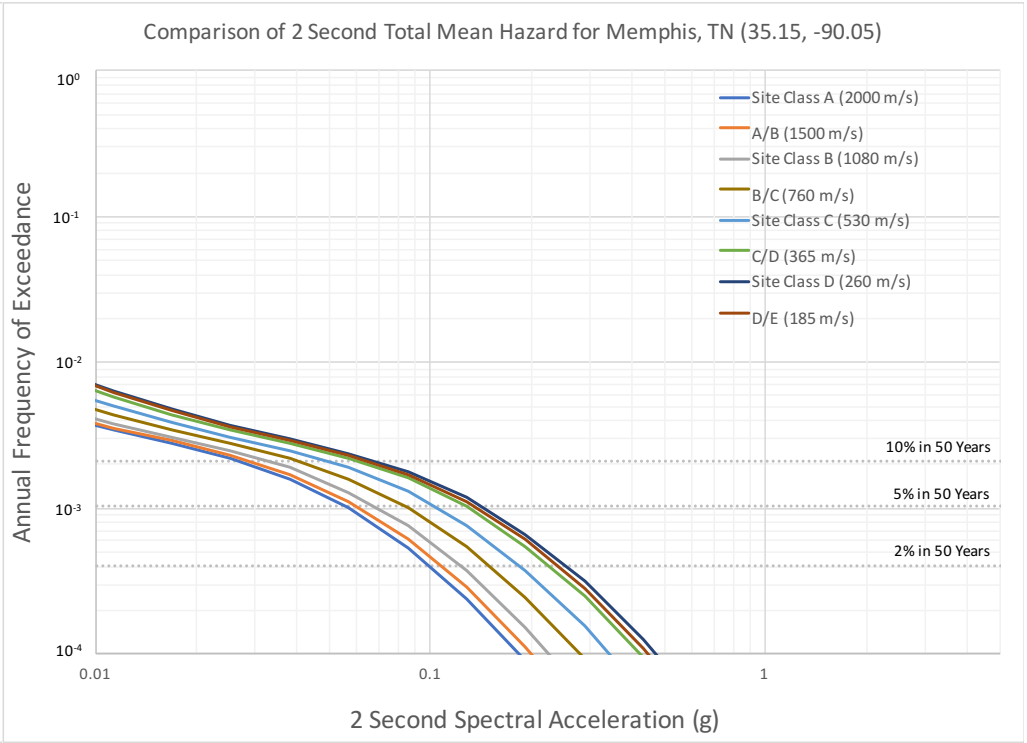

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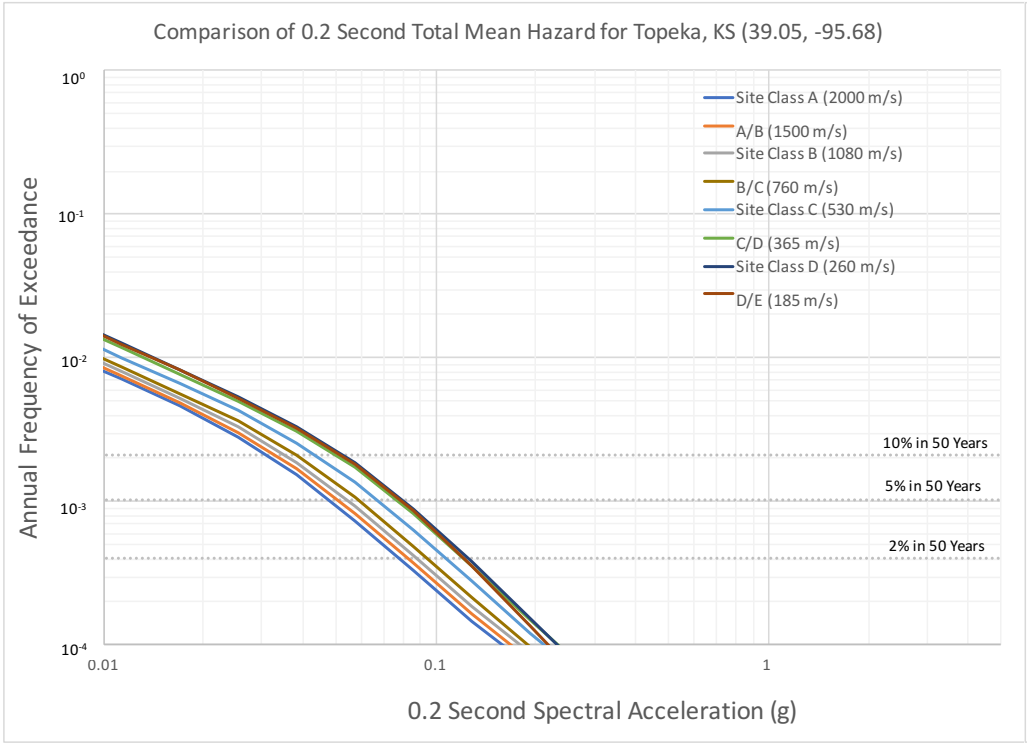

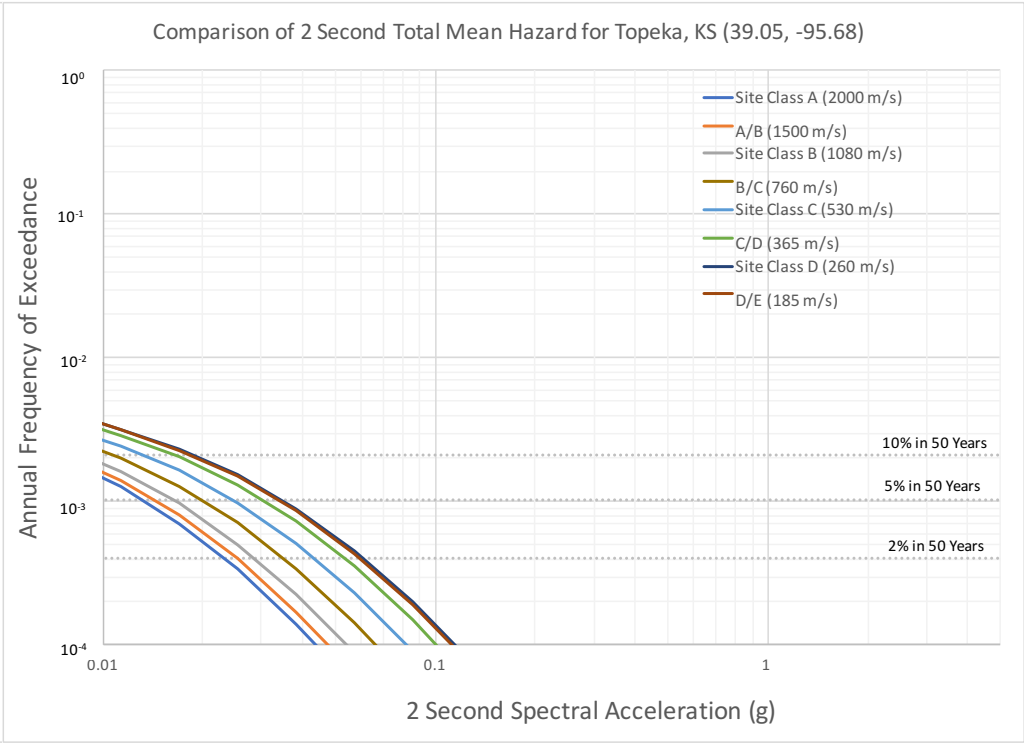

Summary/Discussion

1. Amplification model looks reasonable?

2. Gives us the ability to make uniform maps for the conterminous US for additional periods and site classes.